March 5, 1902) has given us a most important contribution to the knowledge of these animals, principally based on the material (some 800 specimens) collected by Messrs. Nelson and Goldman in Mexico. The genus Heteromys takes the place of our common Perognathus in the warmer parts of Mexico and in Central America, but comes north (as Dr. Merriam's paper shows) into the states of Chihuahua and Sonora, and to Brownsville, Texas. However, these more northern animals, along with a number of others, represent a type so far departing from typical Heteromys that Dr. Merriam segregates them under a new generic name, Liomys. The type of the new genus is *Liomys alleni*, — the *Heteromys alleni* of Coues, 1881.

Taking Heteromys and Liomys together, and considering only the fauna of America north of Panama, no species were known previous to 1868, when Gray described four. In 1874 Peters described one, in 1881 Coues one, in 1893 Thomas published four, and two were made known by Allen and Chapman in 1897. Thus, in all, twelve were known; and to these Dr. Merriam now adds twenty!

T. D. A. C.

Osteology of the Flamingoes. — Dr. R. W. Shufeldt[1] describes the skeleton of the flamingo (*Phœnicopterus ruber*) with special reference to the relations of the flamingoes to the Anseres (ducks, geese, swans) on the one hand, and to the Herodiones (ibises, herons, storks) on the other. The author compares minutely the flamingo skeleton, bone by bone, with the skeletons of representatives of the other groups. On the whole, the flamingo skeleton presents a mixture of anserine and ibidine characters, together with certain characters which are distinctly peculiar to itself. For the most part there is no marked predominance of either anserine or ibidine features. In furcula, coracoid, and wing skeleton, the anserine characters are in excess. The tarso-metatarsus resembles most closely that of an ibis.

The author concludes that, so far as the skeleton is concerned, the flamingoes should constitute an independent group or suborder (Odontoglossæ, corresponding to Huxley's Amphimorphæ) standing between the anserine and pelargo-ibidine forms.

H. W. R.

Regeneration in Hydra viridis. — *Hydra viridis* has been made the subject of a series of regenerating and grafting experiments by

[1] Shufeldt, R. W. Osteology of the Flamingoes, *Annals of the Carnegie Museum*, vol. i (1901), pp. 295–324, Pls. IX–XIV.

Dr. Helen Dean King.[1] It was found that the removal of the oral end by a cut just below the tentacles was followed by the regeneration of fewer tentacles than were possessed originally, while the diameter of the regenerated hypostome was less than that of the original hypostome. As this operation reduces the volume of the body, the result appears to agree with the view advanced by Parke[2] (p. 702), "that a certain ratio exists between the size of a Hydra and its number of tentacles, and that when this ratio is destroyed by an increase or decrease in size of the Hydra, there will be an increase or decrease in the number of tentacles of that Hydra." When the tentacles were removed by cutting at the base of each one so as not to diminish the volume of the trunk, in most cases as many tentacles were regenerated as had been removed.

The severed "heads" remodeled themselves into small polyps, and, although the hypostomes suffered reduction in diameter, in no case was a reduction in the number of tentacles observed, in spite of the smallness of the polyps. This, the author maintains, does not support Parke's view. (It should be noted, however, that Parke's statement was made with reference only to change of size resulting from favorable or unfavorable conditions, — not to decrease in volume by the mechanical removal of part of the body.)

Double-headed forms were produced by splitting the oral end longitudinally. When the tentacles were first removed, the total number of tentacles ultimately borne by the two heads together was an average of 3.4 tentacles per hydra greater than the number originally borne. When the tentacles were not removed previous to the splitting of the oral end, the average number of new tentacles developed by the two heads together was 5.1 per hydra. These double-headed polyps resolve themselves into two polyps by what resembles a process of longitudinal division, the final separation occurring at the extreme aboral end. Some of these double-headed forms were made to attach themselves oral end downwards. The separation of the two parts occurred at the aboral (upper) end as before, proving that the longitudinal fission is not due simply to the constant strain exerted by gravity at the point of divergence of the two branches of the trunk.

[1] King, Helen Dean. Observations and Experiments on Regeneration in Hydra viridis, *Arch. für Entwickelungsmech. der Organismen*, Bd. xiii, Hefte 1 and 2 (1901), pp. 135–178. 31 text-figs.

[2] Parke, H. H. Variation and Regulation of Abnormalities in Hydra, *Arch. für Entwickelungsmech. der Organismen*, Bd. x, Heft 4 (1900), pp. 692–710. 9 text-figs.

If the cut edges of a split oral end are permitted to reunite, new tentacles develop at the regions of union. Polyps with fourteen tentacles were thus produced, but the repetition of the operation on a fourteen-tentacled hydra resulted in no further increase of tentacles.

Attempts were made to secure heteromorphosis, or reversal of "polarity," by grafting. In several cases tentacles were developed upon an aboral cut surface or a foot upon an oral cut surface, but in all these cases (which the author interprets as heteromorphosis) the pieces whose polarity appeared to be reversed were very small parts of the trunk. In the case of a graft of any considerable length, the free cut end reproduced parts similar to those which had been cut away from it. In the cases of apparent heteromorphosis exhibited by very small fragments of the trunk, can it be proved that there is not a shifting about of the tissues or a migration of cells, so that the regeneration does not really involve a reversal of polarity?

H. W. R.

A Revised Classification of the Enteropneusta. — It is nine years since Spengel's great monograph of this group was published.

A number of important additions to our knowledge have been made in the meantime, and the author now returns to the subject[1] for the purpose of recasting the systematic arrangement of the species, and rectifying certain violations of nomenclature which the monograph contained.

The total number of species has been increased by thirteen, and information about one of the old species, *viz.*, *Ptychodera flava* Eschscholtz, has been largely extended since the publication of the monograph.

A total of twenty-nine species is now recognized by the author. The arrangement of these into families and genera is as follows:

FAMILY I. HARRIMANIIDÆ SPENGEL, 1901.

Genus 1. *Harrimania* Ritter, 1900.
" 2. *Dolichoglossus* Spengel, 1893.
" 3. *Stereobalanus* Spengel, 1901.

FAMILY II. GLANDICIPITIDÆ SPENGEL, 1901.

Genus 1. *Glandiceps* Spengel, 1901.
" 2. *Spengelia* Willey, 1898.
" 3. *Schizocardium* Spengel, 1891.

[1] Die Benennung der Enteropneusten-Gattungen, *Zool. Jahrbuch*, Abth. für Systematik, Geographie, und Biologie der Thiere, Bd. XV, Heft 2, 1901.